Developing an effective erosion and sediment control program

What are the common elements of an effective ESC program?

- Legal Authority
- BMP requirements
- Inventory of construction sites
- Prioritization of construction sites
- Plan review and approval
- Inspections and enforcement
- Education and training

Legal Authority

What type of legal authority do you have?

- Grading ordinance specifying regulatory threshold (i.e., sq ft of disturbance)
- Ordinance addresses “other wastes” at sites, e.g., paint, cement, fuel, etc.
- Ordinance requires BMP plans, implementation, maintenance, & closeout
- Ordinance includes sanctions or penalties for non-compliance

Model Ordinances stormwatercenter.net

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INTRODUCTION

EPA NPDES Phase II Site | EPA Office of Wastewater Management | NPDES Factsheet

Welcome to the Stormwater Manager's Resource Center! **Now Updated 6/16/03!**

The **Stormwater Manager's Resource Center** is designed specifically for stormwater practitioners, local government officials and others that need technical assistance on stormwater management issues. Created and maintained by the Center for Watershed Protection, the SMRC has everything you need to know about stormwater in a single site:

Watershed Protection Library
Stormwater Slideshows
Manual Builder
Ordinance Selector
Monitoring & Assessment
Program Resources
Assorted Fact Sheets
By Category
Glossary

Do you need to start a stormwater or watershed protection program from scratch? Well, you'll probably need to write a local ordinance to make it happen. Make your life easier by adapting one of the 30 model ordinances we provide here for stormwater management, erosion and sediment control, stream buffers, and other important topics.

About SMRC FAQs Related Links

BMP Requirements

- Does your State have a statewide erosion and sediment control manual?
- What BMPs will you require local construction operators to follow?
- Do your BMP requirements include design specifications and maintenance requirements?

Inventory and prioritization of construction sites

- Develop a system to track construction sites
  - Should include plan review, inspection, and enforcement information on each site
- Prioritize construction sites for inspection
  - Based on risk to water resources, operator history, etc.
- Develop procedures for receipt and consideration of information submitted by the public

Construction program management

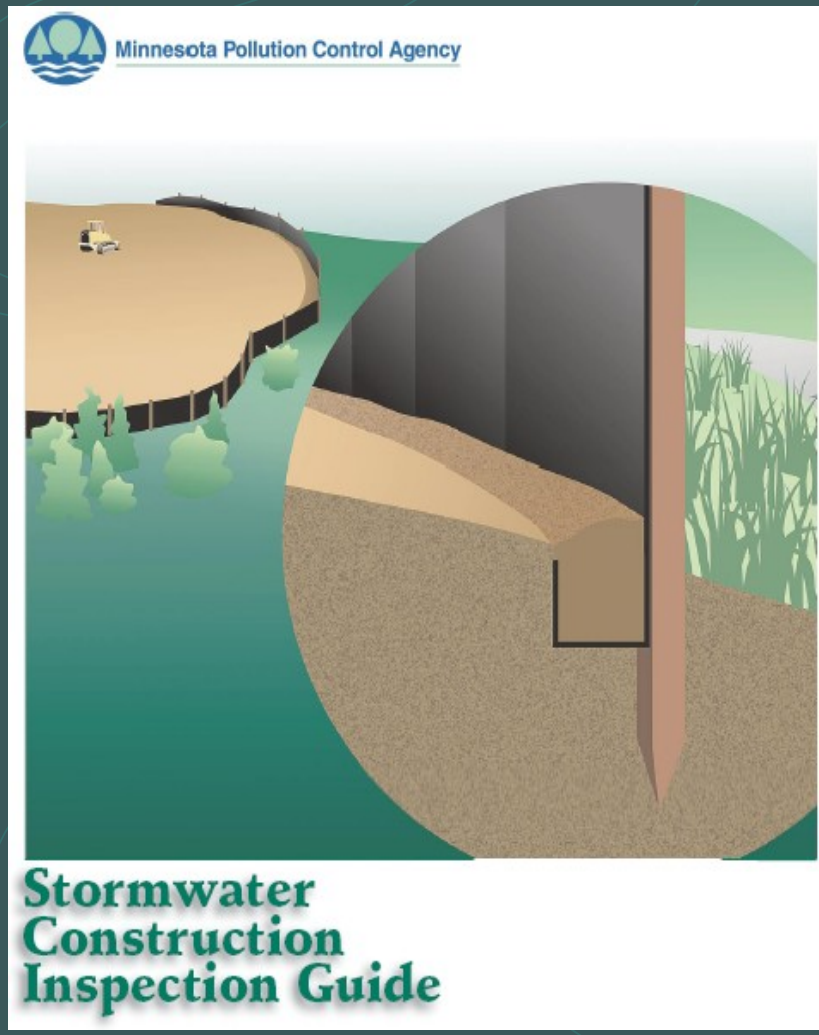
- Pre-construction issues:
  - What defines regulatory authority?
  - How is construction site information collected?
  - What type of information is submitted? When?
  - Who collects it, and what do they do with it?
  - What type of reviews are conducted?
  - Can plan reviewers suggest site improvements?
- Construction phase issues:
  - How are inspections targeted?
  - Who conducts the inspections?
  - What kind of training do they have?
  - What sort of reports do they file?
  - How are enforcement actions determined?

Plan review and approval

- Develop system to review plans - earlier is better!
- Develop criteria and/or a checklist for plan review
- Guidance on what needs to be included in the plans
- Cite standard conditions
- Verify NPDES construction permit coverage
- Coordinate plan review activities with post-construction plan review

Inspections and Enforcement

- Identify who will conduct the inspections
- Decide when will they inspect (regularly, priority-based, after rains)
- Develop procedures for inspecting sites (steps, checklist, reporting)
- Identify procedures for enforcement (warning, re-inspection, citation, etc.)



Education and training

- What type of training will MS4 staff receive?
  - Plan review & admin staff
  - Construction site inspectors
- What type of training will construction operators receive?
  - Engineers, developers, contractors, plan preparers
  - Construction site managers
  - Construction workers

What are some measurable goals?

- Number of construction sites inspected
- Enforcement actions taken
- Number of construction operators attending training sessions
- Number of constructior inspectors trained
- Number of constructior plans reviewed/approv
- Revision of ordinance(s

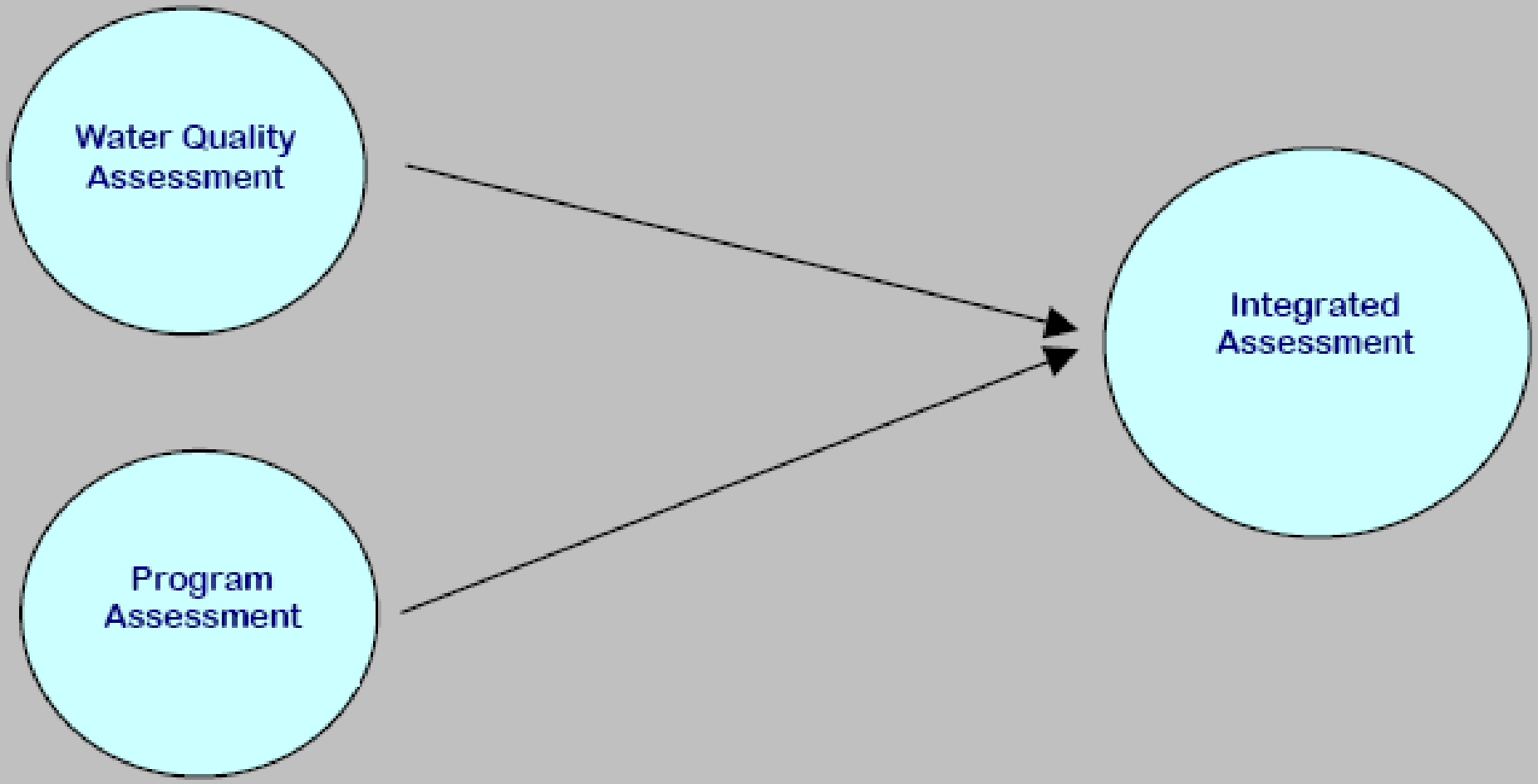
Documentation is vital!

- If it’s not written down, it didn’t happen . . .
- Keep records of all program activities
- Organize records by activity type
  - Ordinance/regulatory
  - Plan reviews
  - Inspections
  - Training
  - Enforcement
- Be ready!

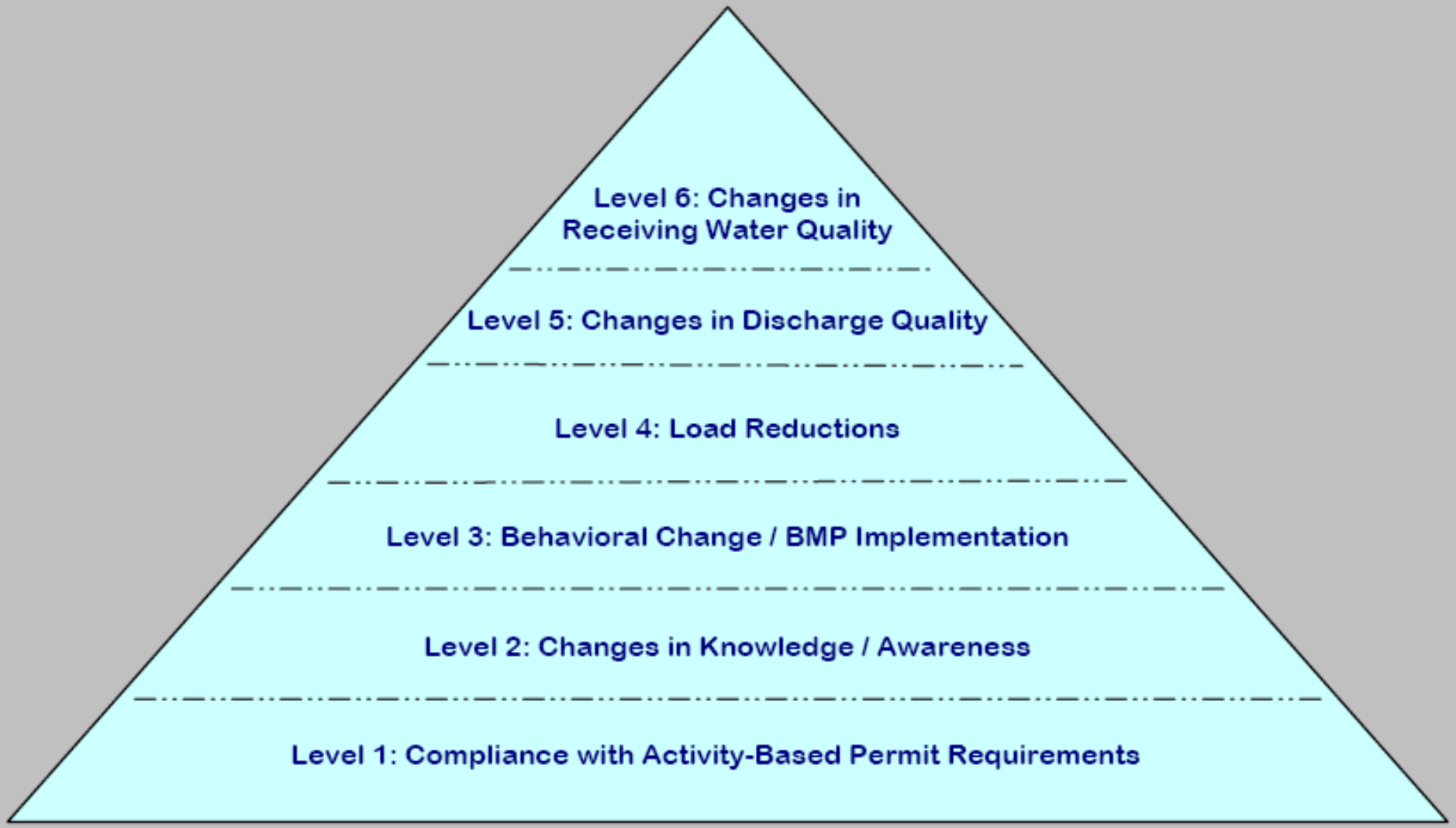
Plan for Program Evaluation

- Assess progress towards meeting measurable goals
- Determine whether BMPs need to be changed
- Decide on what constitutes an effective program

San Diego Effectiveness Framework



Hierarchy of Targeted


Level 6: Changes in Receiving Water Quality
Level 5: Changes in Discharge Quality
Level 4: Load Reductions
Level 3: Behavioral Change / BMP Implementation
Level 2: Changes in Knowledge / Awareness
Level 1: Compliance with Activity-Based Permit Requirements

Evaluation and reporting

- Use the annual reporting process to demonstrate effectiveness
- Look for opportunities to graphically display information
- When reporting activities, compare to total universe possible

Example: Tracking inspections at NOI

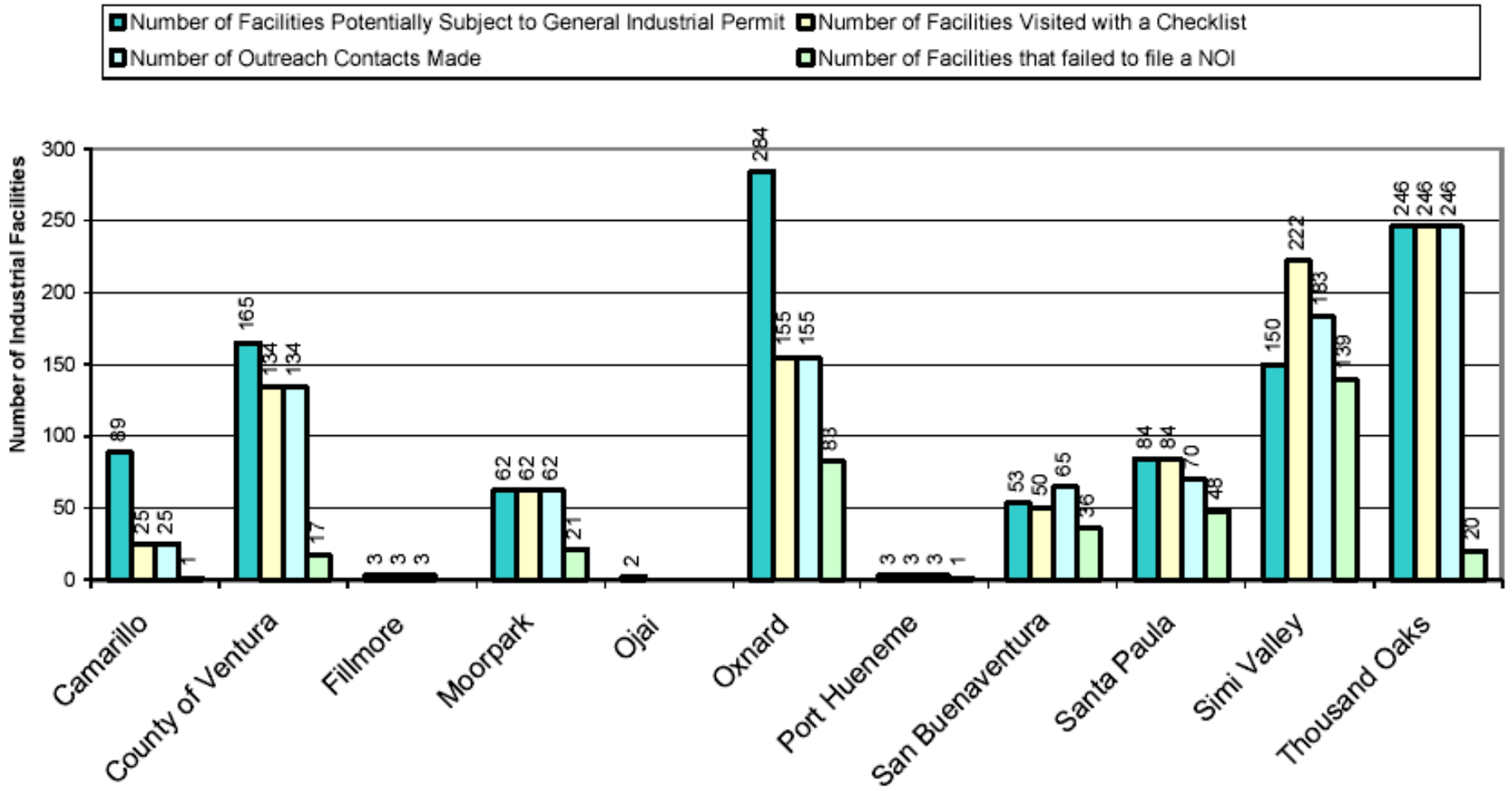
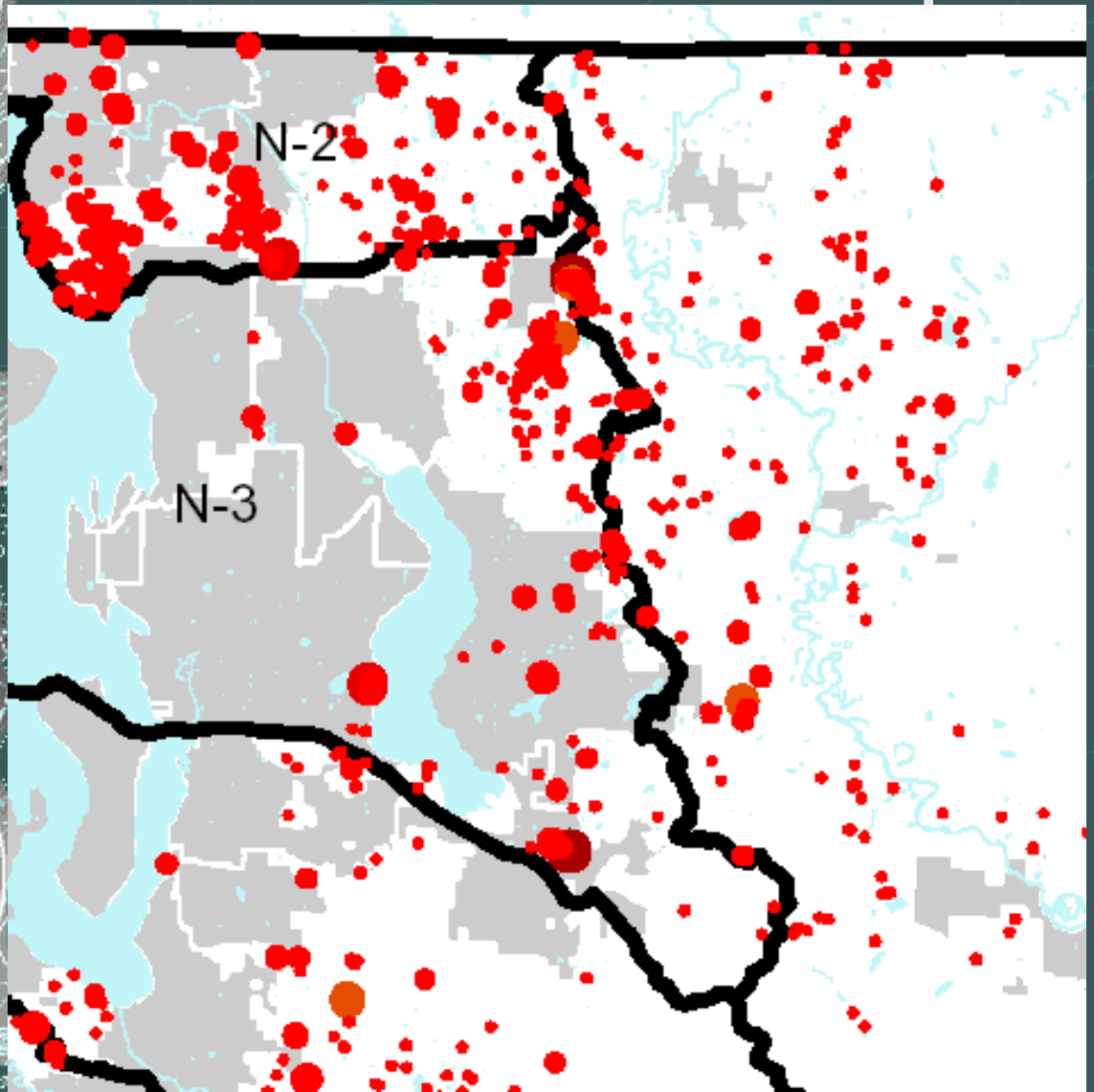


Figure 4-2 Industrial/Commercial Business Facilities Visited (potentially subject to General Industral Permit)

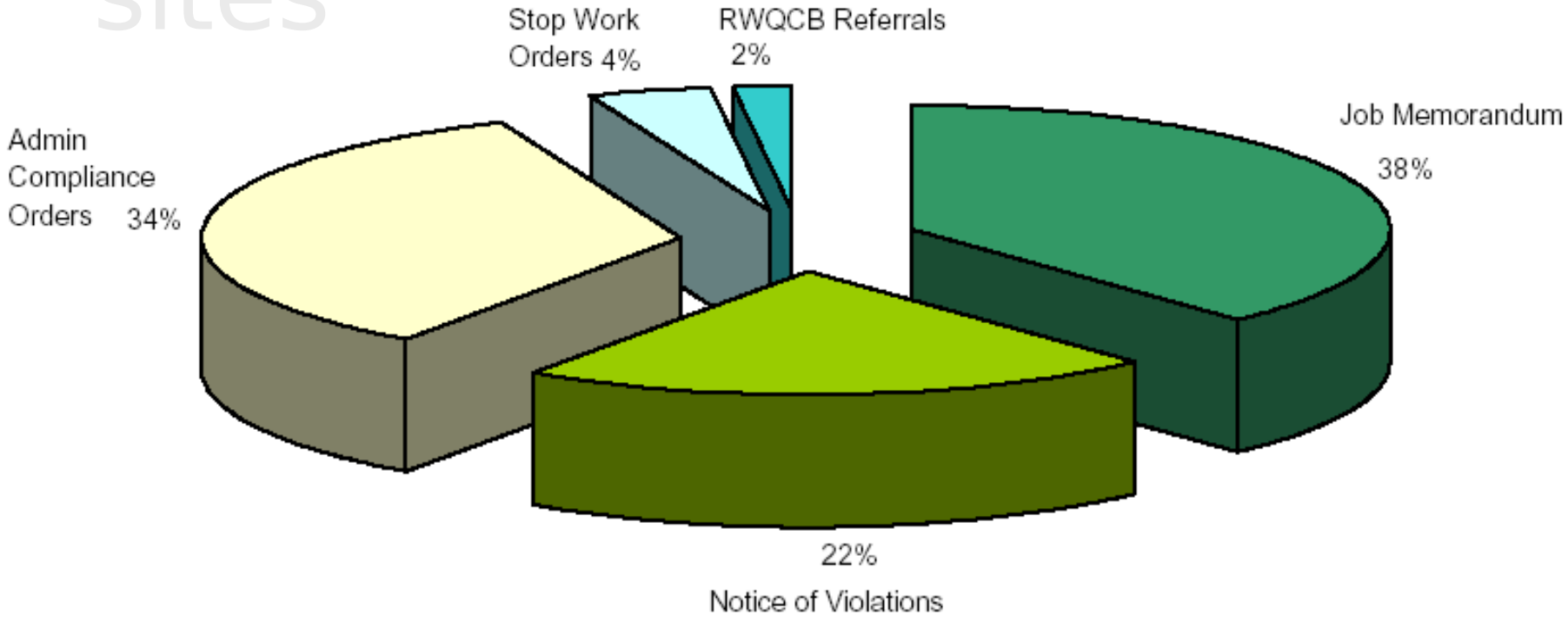
Example: Evaluating construction inspections via



Visits by Inspection Site

- 1 - 2
- 3-6
- 7-11
- 12-15
- 16-21
- 22-30
- 31-55

Example: Enforcement actions at construction sites



Example: King Co., WA table for tracking activities across years

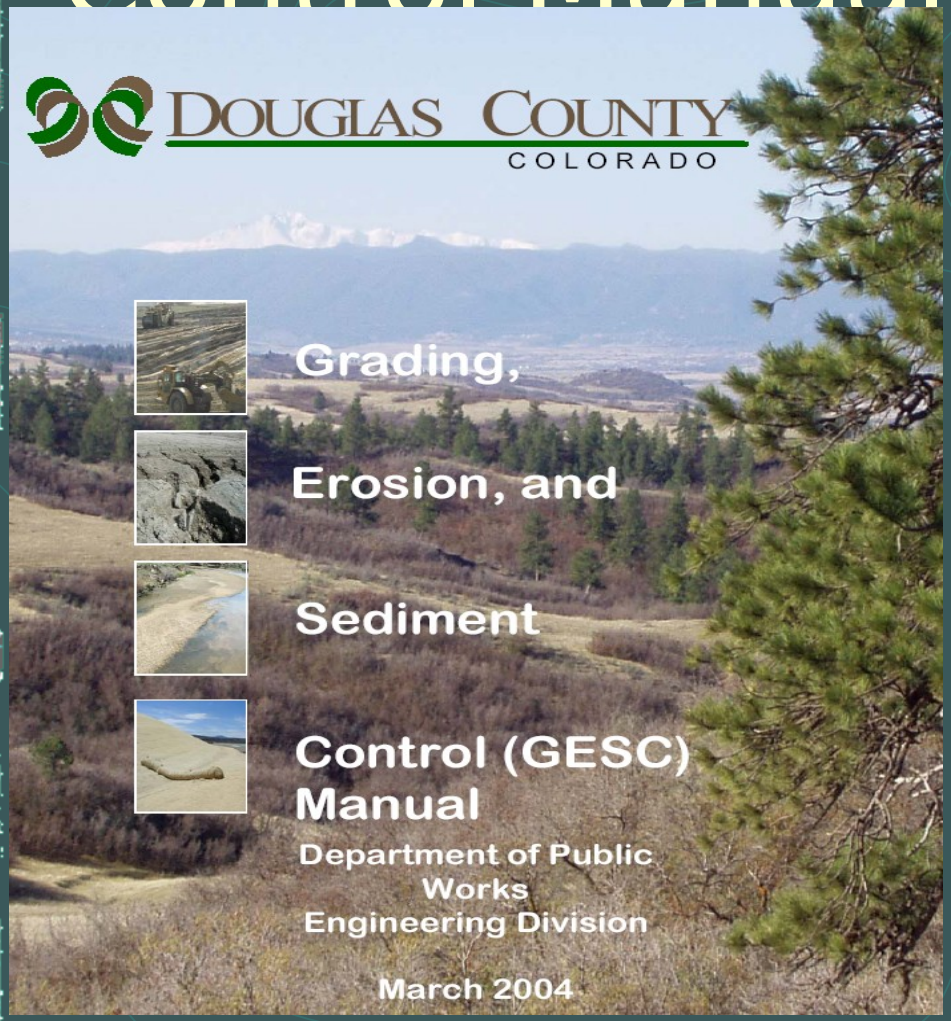
Operations and Maintenance Annual Reporting Table for Stormwat

Task	1996	1997 (Jan-Aug) (1997 Report)	1997 (Jan-Dec) (1998 Report)	1998 (Jan-Dec) (1999 Report)	1999 (Jan-Dec) (2000 Report)	2000 (Jan-D (2001 Repo
seasonal workload ("phased assessments")						
Commercial Facilities						
Inspect conveyance-only commercial drainage systems	yes (0.9 FTE)	yes (0.9 FTE)	yes (0.9 FTE)	new facilities only (30)	new facilities only (30)	Program discontinued CY 2000
Use MIS to inventory facilities and organize work program (includes laptop hookups for field technicians)	yes	yes	yes	yes	Yes	yes
Self-inspection & maintenance of privately owned commercial and multifamily R/D facilities	yes	904 in program	907	900 in program	No (County inspected 1136 facilities, incl. City contracts)	No self-inspection (County inspected 11 facilities, incl. contracts.)
Regional R/D						
Annual inspections of regional R/D	yes	yes	yes	yes	yes	yes
Inspect regional R/D facilities needing frequent maintenance before anticipated storms and after all major storms	yes	yes	yes	yes	yes	yes
Facilities Within Road Rights-of-way						
Routine Maintenance[7]		Proposed	Actual	Actual	Actual	Actual
• curb & gutter (Roads)	11,186 linear ft	559	1,274	1,960	1,697	1,556
• hand ditching (Roads)	1,558 linear ft	5,487	1,487	638	1,674	552
• drainage tile (Roads)	15,427 linear ft	6,070	25,826	20,255	13,115	5,628
• vactor catch basin/manhole (Roads)	7,646	8,599	5,775	3,399	2,664	5,029
• blade ditching/ shoulder pulling (Roads)	750,010 linear ft	556,041	637,592	742,303	342,510	629,010
• clean drain systems—equip (Roads)	126,003 linear ft	93,378	125,435	94,662	72,605	159,444
• clean drain systems—hand (Roads)	6,958	9,211	4,698	5,345	3,253	1,285
• drainage preparation (Roads)	942 man hours	1,105	523	248	519	261

Douglas County, Colorado

- One of the Fastest Growing Counties in the United States
  - 191% from 1990 -2000
- NPDES Phase II Permittee
- Staff
  - 1 ESC inspector until 2000
  - 2000 – 3 Full Time Inspectors
  - 2004 – 3 Full Time GESC Inspectors, 6 Full Time Engineering Inspectors, 7 Full Time Development Review Engineers, Environmental Engineer, Drainage Engineer, Water Quality Technician, Engineering Agreements Technician and Stormwater Management Engineer

Erosion and Sediment Control Manual



- Section 1 – Introduction
- Section 2 Getting Started
- Section 3 – Preparing a GESC Plan
- Section 4 – GESC Plan acceptance and Permit Application
- Section 5 – Field Section
- Section 6 – Project Acceptance and Close-Out
- Section 7 – Low Impact Permit

Manual Format

Permit Step 1: Confirm that a Temporary Batch Plant or Standard GESC Permit is Required.
Section 2.1 provides background information related to Step 1.

Projects that Require a Temporary Batch Plant or Standard GESC Permit

Information *If a Low Impact GESC Permit is required, see Section 7 for applicable Permit Steps and information.*

2.1
The first step in the process is to examine the information in Section 1.4 and 1.5 to confirm that a Temporary Batch Plant or Standard GESC Permit is required for the project. These GESC Permits apply to most land disturbing activities in the County other than small (less than 1 acre) projects with negligible negative impact (requiring a Low Impact GESC Permit) and most agricultural or emergency activities (exempt activities).

The Douglas County Engineering Division can be contacted to clarify GESC Permit requirements and to help interpret which GESC Permit, if any, applies to a particular project. Contact information is provided in Appendix A.

Important! *If a GESC Permit is not required, the process described herein is not applicable; however, BMPs shall still be required in accordance with the information shown in Sections 3 and 5.*

Permit Step 2: Retain a Professional Engineer to Prepare a GESC Plan.
Section 2.2 discusses Step 2.

Who Prepares GESC Plans?

2.2
Laying out erosion and sediment controls on a site may involve engineering design issues such as embankment stability and spillway sizing (for sediment basins), pipe strength calculations (for temporary stream crossings), and peak discharge estimates and hydraulic computations (for determination of flood elevations and velocities and for sizing conveyance facilities).

Because of these issues, Colorado State Statutes require that GESC Plans be prepared by or under the responsible charge of, and signed and stamped by, a Professional Engineer registered in the State of Colorado (see Colorado State Engineering Law 12-25-101, General Provisions). For the purpose of this manual the Professional Engineer is referred to as the Design Engineer. Non-PEs with experience in erosion and sediment control may assist in the development of a GESC Plan, but they must conduct their work under the supervision of the Design Engineer.

GESC Plans are to be prepared under the responsible charge of a Professional Engineer.

It is the responsibility of the Design Engineer to use professional judgment in the development of the GESC plans. If the Design Engineer determines that any GESC requirements, as applied to their specific project, pose a safety hazard, it is the Design

- **Color Coded Highlight Boxes**
- **20 GESC Permit Steps Identified throughout the GESC Manual**

Manual Format

Section 5. Field Section
Step 12. Ensure that BMPs are Correctly Installed and Maintained and that General Construction Requirements are Complied With
DO
Properly installed inlet protection for continuous-grade curb-inlets.
Temporary Inlet Protection. This interim configuration of blocks protects a street inlet prior to paving.
DO
STOP WORK
DON'T
This inlet protection is overdue for sediment removal.
DO
Properly installed area inlet protection.
DON'T
No gaps shall exist between sections of reinforced rock berm.
DON'T
Blocking the inlet opening or use of alternate materials for inlet protection is prohibited.
DON'T
Douglas County Grading, Erosion, and Sediment Control Manual
Page 5-18

- Color Photographs to Clearly Show Proper and Improper Installation and Maintenance of BMPs
- Stop Work Signs to Clearly Indicate what Actions will get you a Stop Work Order
- "DO" and "DON'T" Circles Assist with Distinguishing Good and Poor Practices

Process

- Presubmittal Meeting
  - **Discuss requirements of GESC Plan to help expedite approval of GESC Plans**
- **A Professional Engineer Registered by the State of Colorado or any qualified designer under the direct supervision of a Professional Engineer prepares the GESC plan**
- **BMPs that are identified in the GESC Plan shall be installed prior to the Preconstruction Meeting and Start of Construction**
- **Preconstruction meeting**
  - **Failure Will Result in Rescheduling and Reinspection Fee**
- **Inspections to determine compliance**

GESC Plan Review

- **Every Friday Staff Reviews GESC Plans For “Completeness”**
- **Plans Submitted Before Friday will be Checked that week; Plans Submitted on Friday Will Not Be Checked Until the Following Friday**
- **GESC Plans Determined to be “Incomplete” by Review Staff Will Be Returned to Applicant without Comment**
- **This Process will be Repeated Until a Complete GESC Plan Is submitted *Check list***

GESC Plan Review

- **Plans will Be Assigned to a Development Review Engineer**
- **Reviewed within 25 Days From Submittal, Written Comments Provided**
- **Process Repeats Itself until All Review Comments are Addressed**
- **When Notified Plan Review is Complete, Submit 6-10 Sets of Stamped and Signed GESC Plan Sets**

Permit Fees

- Permit Fees Shall Be Paid to the Engineering Permits Technician Prior to Scheduling the Preconstruction Meeting
- Current Fees are $250.00 Base plus $25.00 per acre of Disturbance

Mandatory Inspections

- **Preconstruction Meeting**
- **Topsoil Inspection (stockpiled correctly)**
- **Anytime During Construction when GESC Managers Changes**
- **Prior to Issuance of Right-of-Way Use and Construction Permits**
- **Initial Close-out Inspection Prior to CO, TCO or Initial Acceptance**
- **2-years after Initial Acceptance/When Vegetation Has Met Required Coverage, Prior to Removal of BMPs**
- **Final Close-out Inspection**

Violations

- **Level I Violations**
  - Pose an immediate and serious risk to the health, safety, or welfare of people and or the environment
  - Result in an immediate issuance of a Stop Work Order and revocation of GESC Permit
- **Level II Violations**
  - Pose a moderate but immediate risk to the health, safety, or welfare of people and or the environment; however, if not immediately corrected will pose a serious risk
  - Shall be corrected as soon as the owner/contractor is notified of the violation(s)
- **Level III Violations**
  - Pose a low but immediate risk to the health, safety, or welfare of people and or the environment; however, if not corrected quickly will pose a more serious risk
  - Shall be corrected with 48 hours of inspection unless otherwise specified in writing by the GESC Inspector

Removing Stop Work Orders

- **Correct Deficient Items**
- **Reapply for GESC Permit and Pay Permit Fees**
- **Schedule Inspection through Permit Technician**
- **Obtain New GESC Permit After Approval of GESC Inspector**
- **Start Work**

Re-Inspection Fees

- **Charged to Sites that are Not in Compliance with GESC Requirements**
- **Must Be Paid at Douglas County Office**
- **No Additional Inspections until Fee is Paid**
- **Designed to Offset the Increased Cost of Multiple Inspections for Non-Compliant Sites**

Download their Manual

- **www.douglas.co.us/GESC**